A new genus of Eusiridae (Crustacea, Amphipoda), associated with the abalone *Haliotis rubra* Leach, in south-eastern Australia

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ABSTRACT
A new genus and species of eusirid amphipod, *Haliogeneia crosnieri*, is described from south-eastern Australia. It appears to be most closely related to the southern temperate and subantarctic genus *Gondogeneia* J. L. Barnard, 1972. *Haliogeneia crosnieri* n.sp. has highly modified gnathopods and has only been found in association with the abalone *Haliotis rubra* Leach.

MOTS CLÉS
Crustacea,
Amphipoda,
Eusiridae,
Haliogeneia,
nouveau genre,
nouvelle espèce,
commensale,
Gastropoda,
Haliotis,
Australie tempérée.

RÉSUMÉ
Un nouveau genre d'Eusiridae (Crustacea, Amphipoda), associé à l'ormeau Haliotis rubra *Leach, dans le Sud-Est de l'Australie.* Une nouvelle espèce d'Amphipode Eusiridae d'un nouveau genre, *Haliogeneia crosnieri*, est décrite du sud-est de l'Australie. Ce genre est étroitement apparenté à *Gondogeneia* J. L. Barnard, 1972, des eaux tempérées et subantarctiques. *Haliogeneia crosnieri* n.sp. a des gnathopodes très modifiés et a été trouvé seulement en association avec l'ormeau *Haliotis rubra* Leach.

INTRODUCTION

Eusirids are mainly free-living amphipods mostly found among shallow-water algae in boreal, temperate and subantarctic areas. There are very few records of eusirids in association with other animals. Griffiths (1974) and Branch (1975) have reported *Calliopiella michaelseni* Schellenberg, 1925, living under the shells of various species of limpet, *Patella* spp., in southern Africa. In this paper we describe a new genus and species of eusirid amphipod, *Haliogeneia crosnieri*, living in association with the abalone *Haliotis rubra* Leach in south-eastern Australia. *Calliopiella* and *Haliogeneia* do not appear to be closely related so their associations with limpets and abalone, although rare in eusirid amphipods, appear to be independent events.

The following abbreviations are used on the plates:

A	antenna;
G	gnathopod;
H	head;
E	epistome;
EP	epimeron;
MD	mandible;
MP	maxilliped;
MX	maxilla;
P	pereopod;
T	telson;
U	uropod;
l	left;
r	right.

Material is deposited in the Australian Museum, Sydney (AM).

Haliogeneia n.g.

TYPE SPECIES. — *Haliogeneia crosnieri* n.sp.

ETYMOLOGY. — From the abalone genus *Haliotis* and "geneia", the stem for pontogeneid-type eusirids.

DIAGNOSIS

Head: eyes reniform. Antenna 1: peduncular article 3 not produced apicoventrally; accessory flagellum scale-like. Epistome: not produced. Mandible: molar conical, weakly triturative. Maxilla 1: palp well-developed, article 1 shorter than article 2; article 3 shorter than article 2. Maxilla 2: inner plate as broad as outer plate; inner plate without oblique setal row, with 2 plumose setae near margin. Maxilliped: outer plate small, not reaching apex of palp article 3. Gnathopods 1 & 2: subchelate, similar, stout, gnathopod 1 slightly smaller than gnathopod 2; carpi shorter than propodi with small lobe on posterior margin; dactyli highly modified, scooped-spatulate. Coxae 1-4: large, similar length. Sternal gills absent. Pereopods 5 to 7: meri not strongly produced posteriorly; dactyli with well-developed subterminal seta. Pleonites 1 to 3 smooth. Uropods 1 and 2: with lateral robust setae. Uropod 3: rami subequal in length. Telson cleft.

REMARKS

Haliogeneia is very similar to *Gondogeneia* J. L. Barnard, 1972. The main differences between these genera are in the molar, which is reduced and conical in *Haliogeneia* but well-developed and columnar in *Gondogeneia,* and in the dactyli of gnathopods 1 and 2, which are of a highly-derived scooped-spatulate form in *Haliogeneia*.
Haliogeneia does not appear to be closely related to *Calliopiella* Schellenberg, 1925, the only other eusirid genus known to have an association with gastropod molluscs. In addition to the modified molar and gnathopods, *Haliogeneia* differs from *Calliopiella* in the absence of an oblique setal row on the inner plate of maxilla 2, in the much more setose uropods and in the cleft telson.

Haliogeneia crosnieri n.sp.
(Figs 1-5)

TYPE MATERIAL. — **Australia.** Second Pressure Reef, south of Bunga Head, New South Wales, approximately 36°36'S - 150°03'E, 13 m depth, in association with the abalone *Haliotis rubra*, X.1995, coll. E. Koellner: holotype, ♀ 11.5 mm (AM P49724); paratype, ovig. ♀, 10.0 mm (AM P49725); paratype, ovig. ♀, 10.5 mm (AM P49726); paratype ♀ (AM P49728); 18 paratypes (AM P49727).

ETYMOLOGY. — This species is named to honour Alain Crosnier who for years has been the main facilitator for the description of the South Pacific and western Indian Ocean marine fauna. We thank him for allowing us to study the lysianassoid amphipod collections under his care. His generosity and encourage-

ment gave us the opportunity to study and learn from collections which were available in no other way.

Description

Based on holotype female. Colour: when live, "luminous" blue (according to collector of type material, E. Koellner). Head: slightly deeper than long; lateral cephalic lobe subquadrate, slightly produced; anteroventral margin vertical, rounded; rostrum small; eyes medium, slightly reniform. Antenna 1: medium length, 0.25 times body; peduncular article 1 longer than (1.6 times) article 2; article 2 longer than (2.0 times) article 3; article 3 shorter than (0.3 times) article 1; accessory flagellum present, scale-like; flagellum 31-articulate, with groups of setae along posterior margin of most articles; calceoli absent. Antenna 2: peduncular article 3 short, length 1.4 times depth, without flange on anterolateral margin; article 5 long, length 1.3 times depth; flagellum longer than peduncle, more than 33-articulate; calceoli absent.

Epistome and upper lip: fused, not produced. Mandibles: incisors asymmetrical, left with six serrations, right with ten serrations; laciniae mobilis asymmetrical, left with eleven serrations, right with four serrations; accessory setal rows, left with four serrate setae, right with three serrate setae; molars conical, with reduced triturating surface, with one long pappose seta; article 2 long, 2.0 times as long as wide, 1.4 times article 3; article 3 short, 2.7 times as long as wide. Lower lip: inner lobes absent. Maxilla 1: inner plate small, subovate, with three pappose

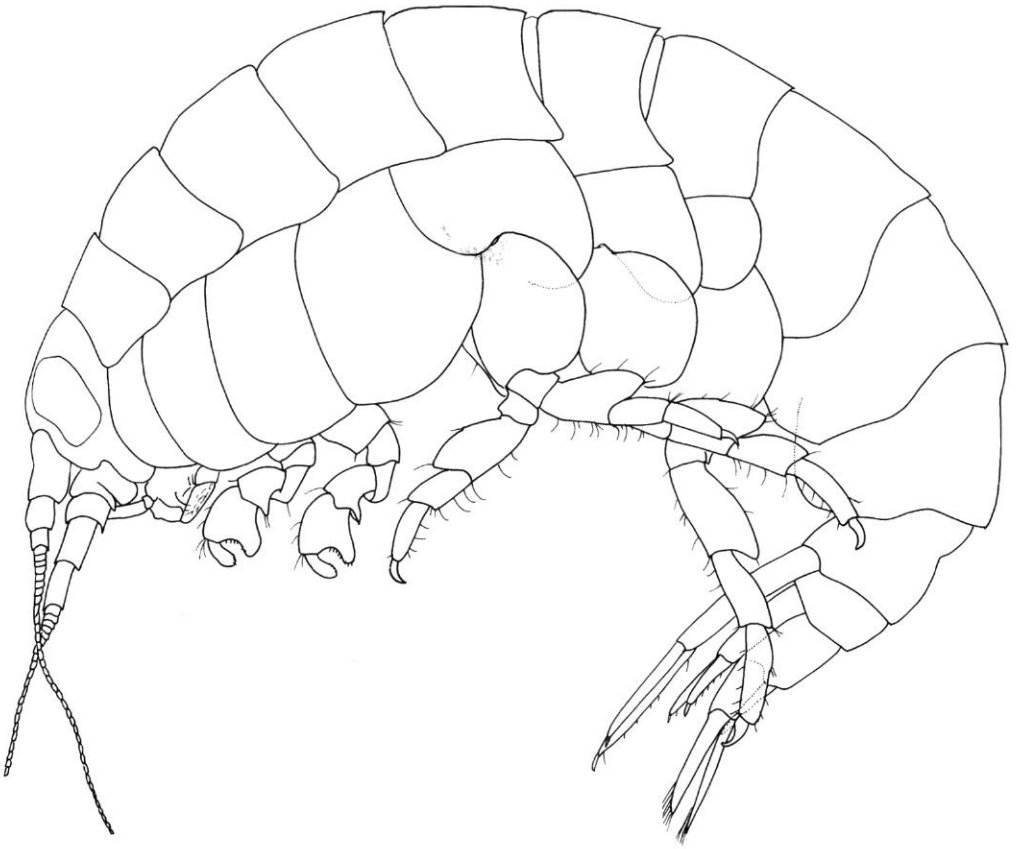

Fig. 1. — *Haliogeneia crosnieri* n.sp., holotype ♀, 11.5 mm (AM P49724), south of Bunga Head, New South Wales, Australia.

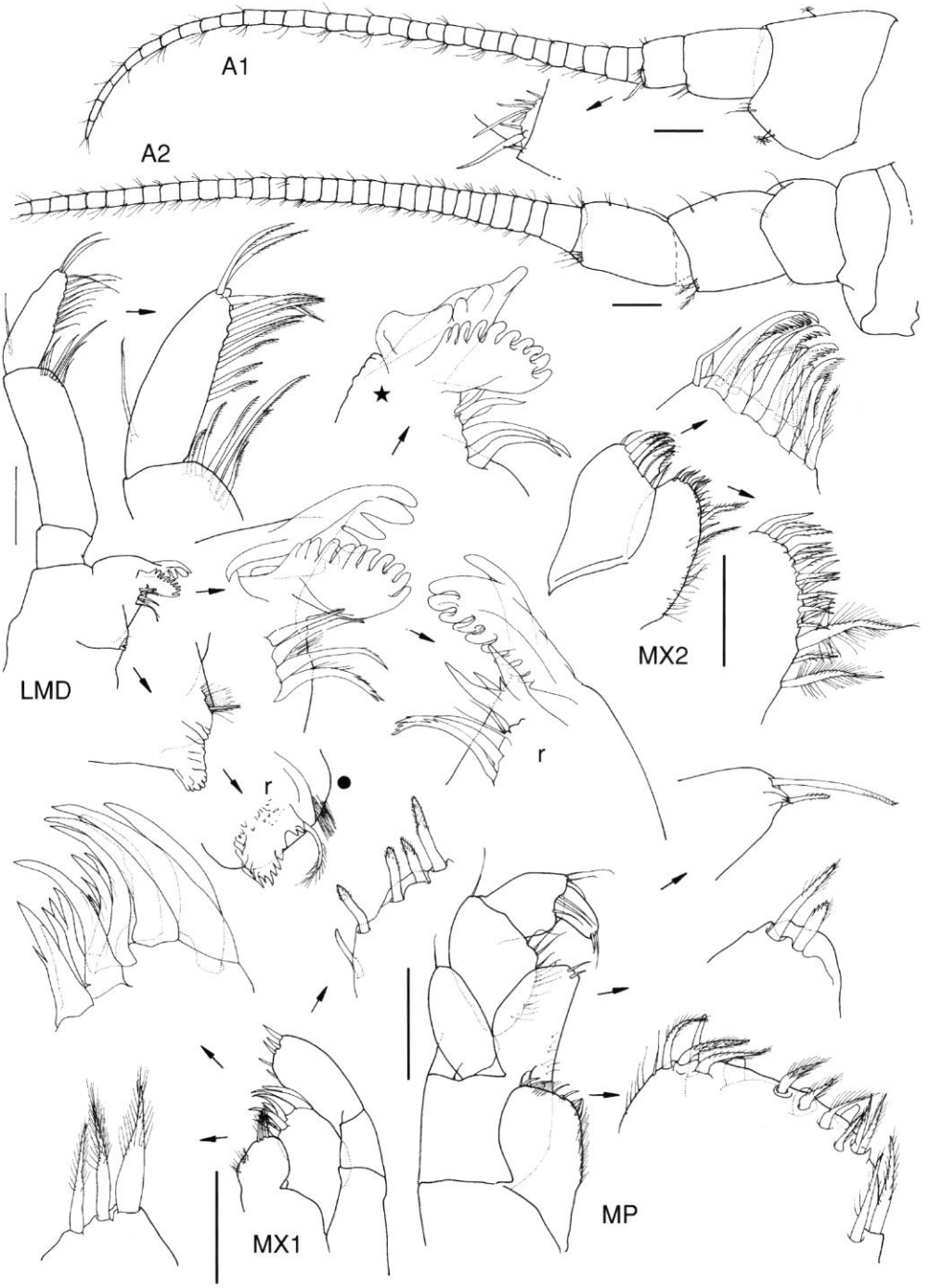

FIG. 2. — *Haliogeneia crosnieri* n.sp., holotype ♀, 11.5 mm (AM P49724); * paratype ♀, 10.0 mm (AM P49725); • paratype ♀, 10.5 mm (AM P49726); south of Bunga Head, New South Wales, Australia. Scale bars: 0.2 mm.

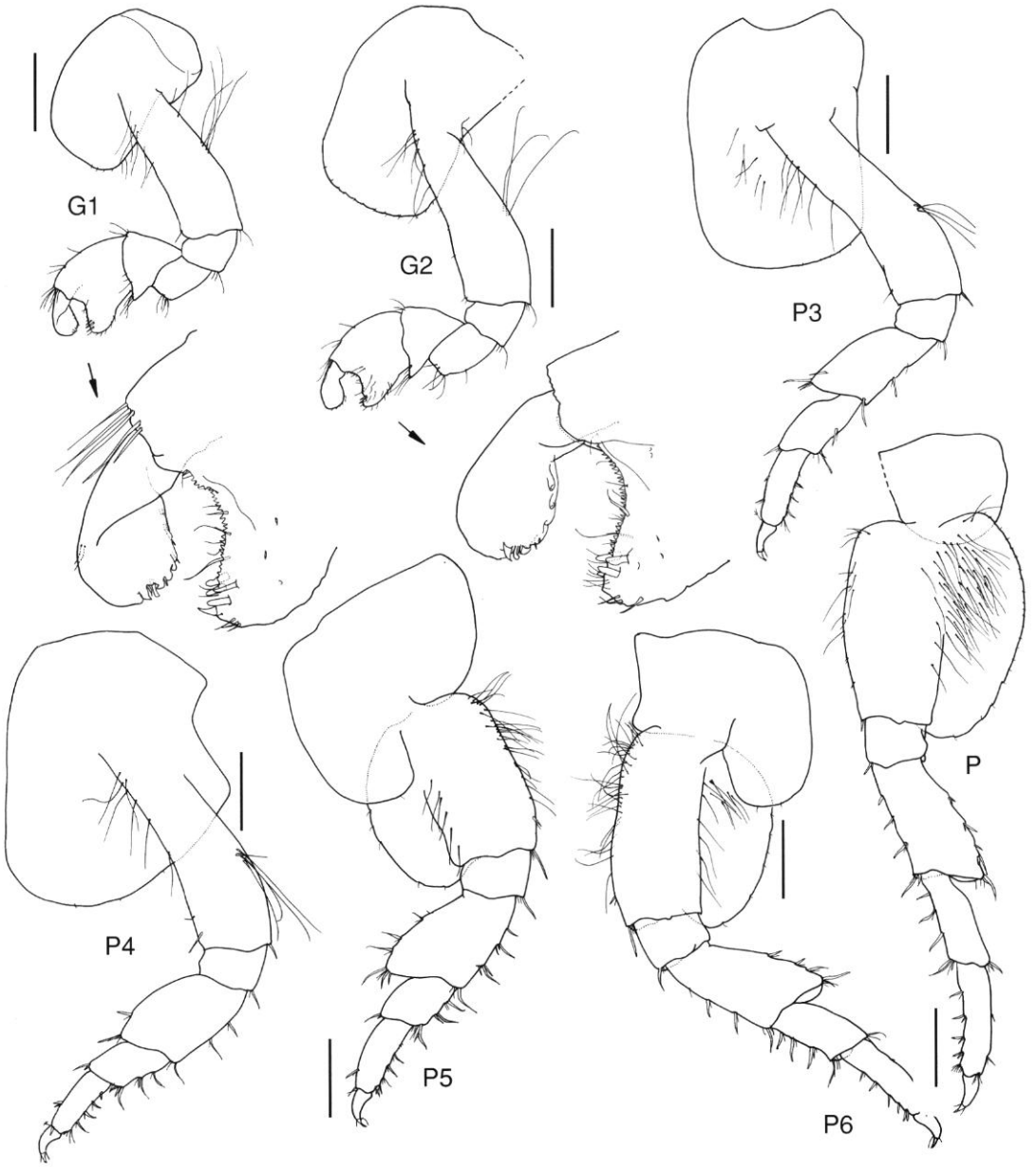

FIG. 3. — *Haliogeneia crosnieri* n.sp., holotype ♀, 11.5 mm (AM P49724); south of Bunga Head, New South Wales, Australia. Scale bars: 0.5 mm.

setae; outer plate with eleven strong setal-teeth; palp 2-articulate, article 1 0.6 times article 2, article 2 with five apical setae, without subterminal setae. Maxilla 2: inner and outer plates broad; inner plate with apical slender setae, with medial slender setae, without oblique row of slender setae, medial margin with two large pappose setae; outer plate with apical robust setae, without medial slender setae. Maxilliped: inner plate small, just reaching base of outer plate, subrectangular, with three apical nodular setae and nine apical pappose seate, with two apicomedial pappose setae, without oblique setal row, without robust setae or submarginal setae along medial margin; palp large, 4-articulate; article 2 broad, with setose inner margin; article 3 short, without setose inner margin; dactylus spatulate, unguis absent.

Gnathopod 1: subchelate, slightly smaller than gnathopod 2; coxa deeper than wide, anteroventral margin rounded; basis long, subrectangular, with tuft of five long, slender setae on posterior margin; carpus subtriangular, short, length 0.9 times breadth, shorter than (0.7 times) propodus, with a small, acutely-produced lobe; propodus broad, length about as long as width, produced posterodistally, palm slightly obtuse, concave, margin lined with short spines, with a single robust seta near inner base of dactylus, with several posterodistal robust setae; dactylus broadened distally, scooped-spatulate. Gnathopod 2: subchelate; coxa deeper than wide; basis long, subrectangular, with tuft of four long, slender setae on posterior margin; carpus subtriangular, short, length about 0.9 times breadth, shorter than (0.7 times) propodus, with a small, acutely-produced lobe; propodus broad, about as long as wide, produced posterodistally, palm slightly obtuse, concave, margin lined with short spines, with a slender seta near inner base of dactylus,

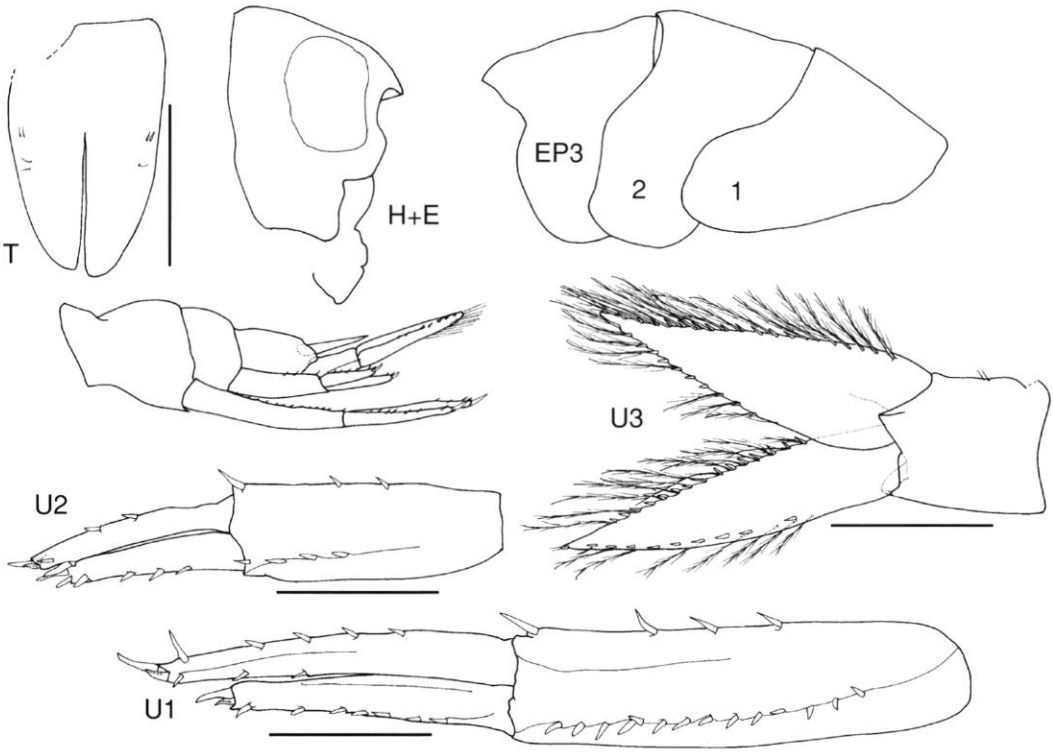

FIG. 4. — *Haliogeneia crosnieri* n.sp., holotype ♀, 11.5 mm (AM P49724), south of Bunga Head, New South Wales, Australia. Scale bars: 0.5 mm.

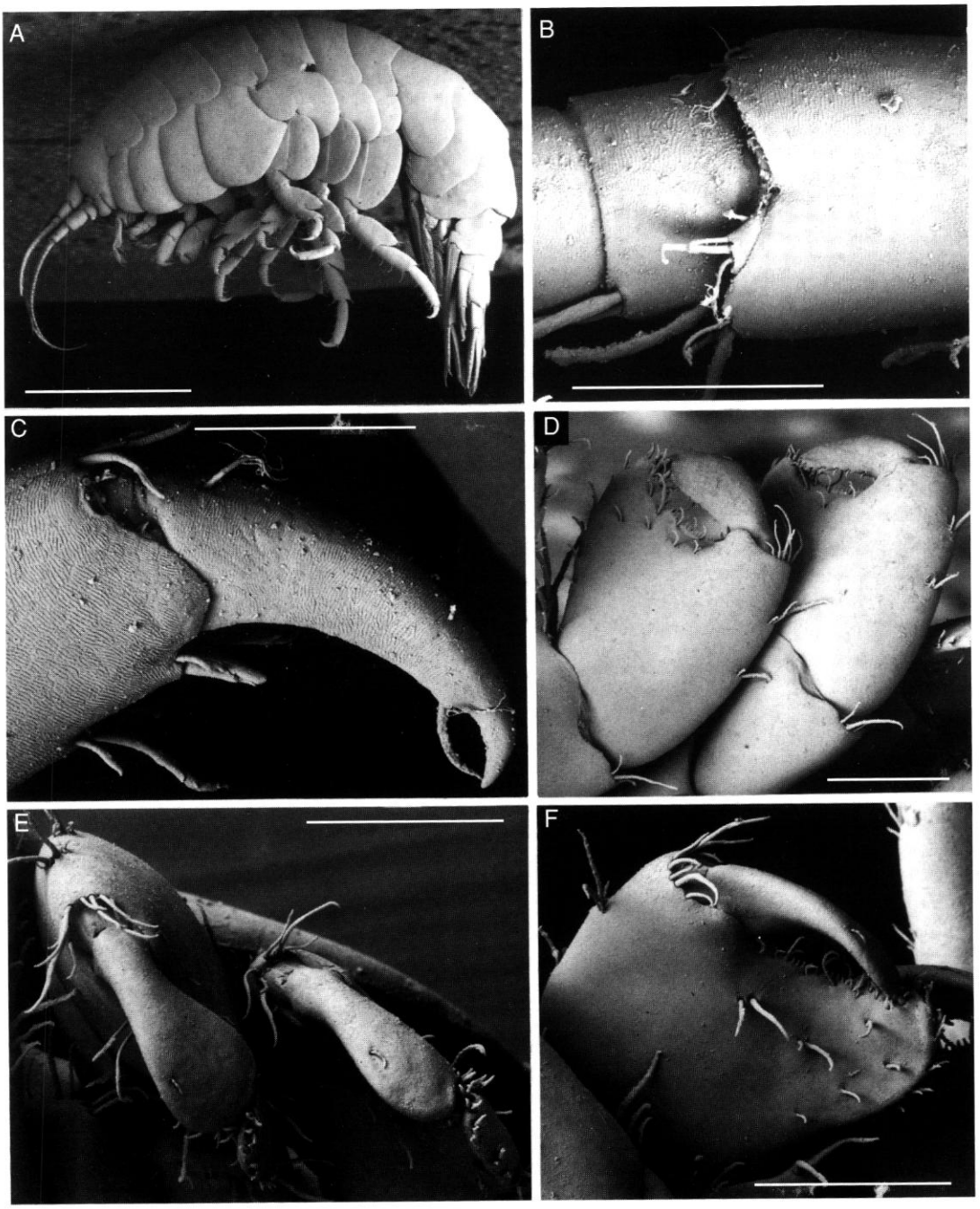

FIG. 5. — *Haliogeneia crosnieri* n.sp., paratype ♀ (AM P49728); **A**, whole animal; **B**, medial view of antenna 1 showing scale-like accessory flagellum; **C**, dactylus of peraeopod 6; **D**, lateral view of gnathopods 1 and 2; **E**, anterior surface of spatulate dactyli of gnathopods 1 and 2; **F**, medial view of propodus and dactylus of gnathopod 1. Scale bars: A, 2 mm; B, 100 µm; C, 100 µm; D, 200 µm; E, 200 µm; F, 200 µm.

with several posterodistal robust setae; dactylus broadened distally, scooped-spatulate.

Pereopod 3: coxa deeper than wide; basis long, subrectangular, anterior margin with five long slender setae, posterior margin with tuft of three long slender setae; merus long, length 1.6 times breadth, anterior margin slightly expanded; carpus long, length 1.8 times breadth; propodus length 2.7 times breadth, with five setae along posterior margin. Pereopod 4: coxa slightly deeper than wide, with slightly developed posteroventral lobe; basis long, subrectangular, anterior margin with seven long slender setae, posterior margin with tuft of five long slender setae; merus long, length 1.5 times breadth, anterior margin slightly expanded. Pereopod 5: coxa about as wide as deep, with posteroventral lobe; basis expanded posteriorly, with long slender setae along anterior margin; merus long, length 1.4 times breadth, expanded posterodistally; carpus short, subquadrate, length 1.2 times breadth; propodus subrectangular, length 2.6 times breadth. Pereopod 6: coxa about as wide as deep, with posteroventral lobe; basis expanded posteriorly, with slender setae along anterior margin; merus long, length 1.6 times breadth, expanded posterodistally; carpus short, length 1.8 times breadth; propodus subrectangular, length 3.2 times breadth. Pereopod 7: coxa small, about as wide as deep, not lobed; basis expanded posteriorly, with slender setae along anterior margin; merus long, length 1.7 times breadth, expanded posterodistally; carpus long, length 2.6 times breadth; propodus subrectangular, length 4.0 times breadth. Pereopods 3 to 7: dactylus short, curved, with prominent subterminal seta.

Epimeron 3: posteroventral corner broadly rounded. Uropod 1: peduncle with fourteen dorsolateral robust setae and four dorsomedial robust setae; inner ramus slightly longer than outer; outer ramus with seven lateral and two apical robust setae; inner ramus with three medial, five lateral and two apical robust setae. Uropod 2: peduncle with four dorsolateral robust setae and three dorsomedial robust setae; rami subequal in length; outer ramus with four lateral and two apical robust setae; inner ramus with two lateral, and three apical robust setae. Uropod 3: peduncle short, without dorsolateral or dorsomedial robust setae; rami subequal in length, lined with plumose setae; outer ramus with nine lateral and fifteen medial robust setae; inner ramus with nine medial and eleven lateral robust setae. Telson: moderately cleft (56%), longer than broad, length 1.7 times breadth, without dorsal robust setae, with sparse dorsal slender setae, distal margins rounded, without apical setae.

REMARKS

Haliogeneia crosnieri appears to be a specialized *Gondogeneia* which has developed some kind of association with the abalone *Haliotis rubra*. Mr E. Koellner (commercial abalone diver) has observed specimens falling off the shells when they are brought on deck. There is some indication that it may be living on the mantle of the abalone. The dactyli of the gnathopods have a slightly scooped spatulate shape. Unfortunately, we have no information about how they are used.

There is only one male specimen (8.0 mm) in the collection; there are no calceoli on its antennae.

Acknowledgements

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